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DATE: Tuesday, September 06, 2005

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<input type="checkbox"/>	L8	L7 and (upper adj side)	4
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<input type="checkbox"/>	L5	L4 and transmitt\$	18
<input type="checkbox"/>	L4	L3 and (sonic or energy or megasonicx)	44
<input type="checkbox"/>	L3	L1 and (processing or clean\$ or treat\$)	80
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L8: Entry 3 of 4

File: USPT

Jan 27, 2004

US-PAT-NO: 6681782

DOCUMENT-IDENTIFIER: US 6681782 B2

**** See image for Certificate of Correction ****TITLE: Wafer cleaning

DATE-ISSUED: January 27, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bran; Mario E.	Garden Grove	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Verteq, Inc.	Santa Ana	CA			02

APPL-NO: 10/ 243463 [PALM]

DATE FILED: September 12, 2002

PARENT-CASE:

RELATED APPLICATIONS This application is a continuation of U.S. application Ser. No. 09/953,504, filed Sep. 13, 2001, now U.S. Pat. No. 6,463,938, issued Oct. 15, 2002, which is a continuation of U.S. application Ser. No. 09/643,328, filed Aug. 22, 2000, now U.S. Pat. No. 6,295,999, issued Oct. 2, 2001, which is a continuation of U.S. application Ser. No. 09/057,182, filed Apr. 8, 1998, now U.S. Pat. No. 6,140,744, issued Oct. 31, 2000, which is a continuation-in-part of U.S. application Ser. No. 08/724,518, filed Sep. 30, 1996, now U.S. Pat. No. 6,039,059, issued Mar. 21, 2000.

INT-CL: [07] B08 B 3/12

US-CL-ISSUED: 134/148; 134/1.3, 134/25.4, 134/147, 134/151, 134/153, 134/184, 134/199, 134/902

US-CL-CURRENT: 134/148; 134/1.3, 134/147, 134/151, 134/153, 134/184, 134/199, 134/25.4, 134/902

FIELD-OF-SEARCH: 134/1.3, 134/25.4, 134/147, 134/148, 134/151, 134/153, 134/184, 134/199, 134/902

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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<input type="checkbox"/>	<u>2699403</u>	January 1955	Courts	
<input type="checkbox"/>	<u>2713998</u>	July 1955	Eicken	
<input type="checkbox"/>	<u>2738173</u>	March 1956	Massa	
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<input type="checkbox"/>	<u>5013366</u>	May 1991	Jackson et al.
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	<u>5037481</u>	August 1991	Bran

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<input type="checkbox"/>	<u>5247954</u>	September 1993	Grant et al.
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<input type="checkbox"/>	<u>5348552</u>	September 1994	Nakajima et al.
<input type="checkbox"/>	<u>5364474</u>	November 1994	Williford, Jr.
<input type="checkbox"/>	<u>5365960</u>	November 1994	Bran
<input type="checkbox"/>	<u>5534076</u>	July 1996	Bran
<input type="checkbox"/>	<u>5721463</u>	February 1998	Snyder
<input type="checkbox"/>	<u>6039059</u>	March 2000	Bran
<input type="checkbox"/>	<u>6295999</u>	October 2001	Bran
<input type="checkbox"/>	<u>6463938</u>	October 2002	Bran

134/1.3

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
3212-916	October 1983	DE	
319-806	June 1989	EP	
54-7874	January 1979	JP	
54-69260	April 1979	JP	
57-153638	September 1982	JP	
61-240157	October 1986	JP	
62-281431	December 1987	JP	
63-36534	February 1988	JP	
64-18229	January 1989	JP	
1-246935	October 1989	JP	
1-304733	December 1989	JP	
1-316935	December 1989	JP	
2-53185	April 1990	JP	
55-1114	March 1993	JP	
7-24414	January 1995	JP	

OTHER PUBLICATIONS

Stuart A. Hoenig: Cleaning Surfaces With Dry Ice: Compressed Air Magazine: Aug. 1986: pp. 22-25.

Va-Tran Systems, Inc.: Sno Gun.TM. Dry Ice Snow Cleaning System for Electronic, Semi-Conductor, Medical, Optical and Other Diverse Industries, No date.

*IBM Technical Disclosure Bulletin, Direct Cooling Technique for Quartz Deposition Monitors, vol. 34, No. 7B, 12/91.

CO2 Snow/Pellet Cleaning/Super Critical Fluid Precision Cleaning: Dec. 1995: vol. III. No. 11, p. 48.

Robert Sherman; John Grob and Walter Whitlock; Dry Surface Cleaning Using Co2 Snow: Journal Of Vacuum Science & Technology B. Second Series, vol. 9, No. 4, Jul./Aug. 1991; pp. 1970-1977.

Wayne T. McDermott, Richard C. Ockovic, Jin Jwang Wu and Robert J. Miller, Removing Submicron Surface Particles Using A Cryogenic Argon-Aerosol Technique:

Microcontamination: Oct. 1991; pp. 33-36 and 94-95.

International Search Report for corresponding PCT Application No. PCT/US97/11812 dated Nov. 10, 1997.

10 MHz Ultrasonic Silicon Cleaning Tool, IBM Technical Disclosure Bulletin, vol. 37, No. 6A, p. 585, Jun. 1, 1997.

ART-UNIT: 1746

PRIMARY-EXAMINER: El-Arini; Zeinab

ATTY-AGENT-FIRM: Knobbe, Martens, Olson & Bear, LLP

ABSTRACT:

Semiconductor wafers are cleaned using megasonic energy to agitate cleaning fluid applied to the wafer. A source of energy vibrates an elongated probe which transmits the acoustic energy into the fluid. The probe has a solid cleaning rod and a flared or stepped rear base. In one form, the probe is made of one piece, and in another, the rod fits into a socket in the base. This enables a rod to be made of material which is compatible with the cleaning solution, while the base may be of a different material. A heat transfer member acoustically coupled to the probe base and to a transducer conducts heat away from the transducer. A housing for the heat transfer member and the transducer supports those components and provides means for conducting coolant through the housing to control the temperature of the transducer. In another arrangement, an end of the housing is coupled between the transducer and the probe. In one arrangement, fluid is sprayed onto both sides of a wafer while a probe is positioned close to an upper side. In another arrangement, a short probe is positioned with its end face close to the surface of a wafer, and the probe is moved over the wafer as it rotates. The probe may also be positioned through a central hole in a plurality of discs to clean a group of such elements at one time.

12 Claims, 17 Drawing figures

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Search Results - Record(s) 11 through 16 of 16 returned.

☐ 11. Document ID: US 6209555 B1

Using default format because multiple data bases are involved.

L7: Entry 11 of 16

File: USPT

Apr 3, 2001

US-PAT-NO: 6209555

DOCUMENT-IDENTIFIER: US 6209555 B1

TITLE: Substrate cassette for ultrasonic cleaning

DATE-ISSUED: April 3, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Struven; Kenneth C.	San Carlos	CA		

US-CL-CURRENT: 134/182; 134/184, 134/902, 211/41.18

Full	Title	Citation	Front	Review	Classification	Date	Reference	Examinations	Attachments	Claims	KMC	Draw D
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☐ 12. Document ID: US 6082381 A

L7: Entry 12 of 16

File: USPT

Jul 4, 2000

US-PAT-NO: 6082381

DOCUMENT-IDENTIFIER: US 6082381 A

TITLE: Treatment apparatus

DATE-ISSUED: July 4, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kamikawa; Yuji	Koshi-machi			JP
Shindo; Naoki	Kurume			JP
Kitahara; Shigenori	Chikugo			JP

US-CL-CURRENT: 134/57R; 134/102.2, 134/102.3, 134/902, 134/95.2

ABSTRACT:

A cleaning tank 30 stores a cleaning liquid to clean the surfaces of semiconductor

wafers W immersed in the cleaning liquid. A cleaning liquid supply pipe 33 connects the cleaning tank 30 to a pure water supply source 31. A chemical liquid container 34 stores a chemical liquid, and a chemical liquid supply pipe 36 connects the cleaning liquid supply pipe 33 to the chemical liquid container 34 via an infusion open/close switching valve 35, and a chemical liquid feed means is interposed in the chemical liquid supply pipe 36. The chemical liquid feed means is a reciprocal pump, such as diaphragm pump 37. Thus, a predetermined quantity of the chemical liquid can be infused into pure water or to a drying gas generator to ensure that the chemical liquid of a predetermined concentration be available for washing or drying treatment, regardless of fluctuations in flow amount or pressure of pure water or a drying gas carrier gas.

11 Claims, 12 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 11

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 13. Document ID: US 5669979 A

L7: Entry 13 of 16

File: USPT

Sep 23, 1997

US-PAT-NO: 5669979

DOCUMENT-IDENTIFIER: US 5669979 A

TITLE: Photoreactive surface processing

DATE-ISSUED: September 23, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Elliott; David J.	Wayland	MA		
Hollman; Richard F.	Chelmsford	MA		
Yans; Francis M.	Concord	MA		
Singer; Daniel K.	Natick	MA		

US-CL-CURRENT: 134/1; 134/1.1, 134/1.2, 134/1.3, 257/E21.226, 257/E21.227, 257/E21.256

ABSTRACT:

A method of cleaning a substrate surface, the cleaning being done photoreactively without damaging the surface. A laser beam of UV radiation is delivered at an acute angle to the surface of the substrate, the beam striking the surface at a long and narrow reaction region. The beam and the substrate are moved relative to one another to cause the beam to sweep the surface. While the beam is sweeping the surface, a flow of a reactant gas is provided at the reaction region so that the gas is excited by the UV laser beam. The acute angle of the beam is of a value such that foreign material is removed without essentially damaging the surface of the substrate or leaving a residue that would inhibit further processing of the substrate surface.

16 Claims, 29 Drawing figures

Exemplary Claim Number: 1
Number of Drawing Sheets: 24

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Draw De
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☐ 14. Document ID: US 5368171 A

L7: Entry 14 of 16

File: USPT

Nov 29, 1994

US-PAT-NO: 5368171
DOCUMENT-IDENTIFIER: US 5368171 A

TITLE: Dense fluid microwave centrifuge

DATE-ISSUED: November 29, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jackson; David P.	Glendale	CA	91201	

US-CL-CURRENT: 134/147; 134/1, 204/157.15, 210/167, 210/361

ABSTRACT:

An apparatus for cleaning substrates used in critical environments with stringent end-product cleanliness requirements in a single process using microwave-energized and centrifuged dense fluids. One or more dense fluids are mixed with one or more chemical or physical agents and are simultaneously subjected to microwave radiation and centrifugal force to remove deeply recessed contaminants from internal and external surfaces of intricately arranged or formulated substrates such as biomaterials, spent activated carbon, elastomerics, surgical aids, or dental implants. Subsequently, cleaned substrates are simultaneously subjected to microwave radiation and centrifugal force under vacuum to remove residual volatile contaminants. Additionally, the cleaned and sterilized substrates are contacted with chemical or physical agents to provide enhanced cleaning and to provide new and improved substrate properties such as increased electrical insulation, conductivity, or biocompatibility. Finally, substrates which are prepackaged in semi-permeable membranes are cleaned using this apparatus, thus preventing recontamination of the cleaned substrates.

12 Claims, 5 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMIC	Draw De
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☐ 15. Document ID: US 5344493 A

L7: Entry 15 of 16

File: USPT

Sep 6, 1994

US-PAT-NO: 5344493

DOCUMENT-IDENTIFIER: US 5344493 A

TITLE: Cleaning process using microwave energy and centrifugation in combination with dense fluids

DATE-ISSUED: September 6, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jackson; David P.	Glendale	CA	91201	

US-CL-CURRENT: 134/1; 134/2, 134/21, 134/31, 134/33, 204/158.2, 204/158.21

ABSTRACT:

An environmentally safe process for cleaning substrates used in critical environments with stringent end-product cleanliness requirements in a single process using microwave-energized and centrifuged dense fluids. One or more dense fluids are mixed with one or more chemical or physical agents and are simultaneously subjected to microwave radiation and centrifugal force to remove deeply recessed contaminants from internal and external surfaces of intricately arranged or formulated substrates such as biomaterials, spent activated carbon, elastomerics, surgical aids, or dental implants. Subsequently, cleaned substrates are simultaneously subjected to microwave radiation and centrifugal force under vacuum to remove residual volatile contaminants. Additionally, the cleaned and sterilized substrates are contacted with chemical or physical agents to provide enhanced cleaning and to provide new and improved substrate properties such as increased electrical insulation, conductivity, or biocompatibility. Finally, the entire process is performed on substrates which are prepackaged in semi-permeable membranes, preventing recontamination of the cleaned substrates.

25 Claims, 10 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 6

Full	Title	Citation	Front	Review	Classification	Date	Reference	Examiner	Attorney	Claims	KWC	Draw De
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☐ 16. Document ID: US 4525219 A

L7: Entry 16 of 16

File: USPT

Jun 25, 1985

US-PAT-NO: 4525219

DOCUMENT-IDENTIFIER: US 4525219 A

TITLE: Ampule cleaning and quality control system

DATE-ISSUED: June 25, 1985

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; Larry J.	Overland Park	KS		

US-CL-CURRENT: 134/1; 134/184, 134/25.4, 73/577

ABSTRACT:

Ampules may be cleaned and quality controlled by submerging frangible, sealed, partly filled, floatable ampules in a container in an ultrasonic cleaning tank bath in such manner as to not only clean all the ampules but also break a large portion of any flawed ampules, thereafter separating the intact ampules from the shattered ampules, collecting, washing, drying and packaging the former.

11 Claims, 8 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequence	Attachments	Claims	KWIC	Draw De
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Term	Documents
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ARTICLES	259922
SUBSTRATE	741918
SUBSTRATES	304791
OBJECT	2485527
OBJECTS	1754658
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